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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,096	12/10/2001	Seung Ho Chang	054216-5010	6009

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EXAMINER
YOHA, CONNIE C

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 03/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No. 10/006,096	Applicant(s) HO CHANG, SEUNG
	Examiner Connie c. Yoha	Art Unit 2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 February 2003_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-7_ is/are pending in the application.

   4a) Of the above claim(s) _7-13_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _1-6_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _10 December 2001_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☒ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1.   This office acknowledges receipt of the following items from the Applicant:

Papers submitted under 35 U.S.C. 119(a)-(d) have been placed of record in the

file.

2.   Claims 1-13 are presented for examination.

3.   Claim 7-13 is withdrawn from consideration due to the election of the restriction

requirement (paper #6).

4.   Claims 1-6 are pending.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in
>
> public use or on sale in this country, more than one year prior to the date of application for patent in
>
> the United States.

Claim 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et

al, Pat. No. 6525960.

With regard to claim 1, Yoshida discloses a method of programming a multi-level

flash memory using a sensing circuit that includes a comparator, a reference current

supply unit, a sense amplifier driving determining circuit, and a register array (fig. 9), the

method comprising: a data storing step of storing data, in a register, corresponding to a

level to be programmed (col. 7, line 65-col. 8, line 4); a second level program step of,

after a first program voltage is applied to word lines, turning off the sensing circuit to

maintain a threshold voltage at a first level voltage when the data stored in the register

is a first memory cell being a first data, and performing a program to raise the threshold

voltage to a second level when the data stored in the register is a remaining memory

cells is other than the first data (col. 8, line 5-22); a third level program step of, after a

second program voltage is applied to word lines, turning off the sensing circuit to

maintain a threshold voltage when the data store in the register is one of the first being

the first data and a second memory cell being a second data, and performing a program

to raise the threshold voltage to a third level when the data stored in the register is a

remaining memory cells is other than one of the first and second data (col. 8, line 23-

37); a fourth level program step of, after a third program voltage is applied to word lines,

turning off the sensing circuit to maintain a threshold voltage when the data store in the

register is one of the first being the first data and a second memory cell being a second

data, and a third memory cell being a third data, and performing a program to raise the

threshold voltage to a forth level when the data stored in the register is a remaining

memory cells is other than one of the first, second and third data (col. 8, line 38-52);

With regard to claim 2, Yoshida discloses wherein the first data is "11", the

second data is "10", the third data is "01" and the fourth data is "00" (col. 3, line 52-67)

(also with regard to claim 6).

With regard to claim 3, Yoshida discloses wherein the register includes a number

of bits that represent all numbers of levels by which the memory cells can be

programmed so that data on the level to be programmed is stored (col. 7, line 13-23).

With regard to claim 4, Yoshida discloses wherein the sensing circuit is turned OFF and ON by the sense amplifier driving determining circuit depending on the first to fourth data stored in the register (col. 10, line 6-61).

With regard to claim 5, Yoshida discloses programming method further including an automatic verification program method, wherein an operation of the automatic verification program method is stopped at a time when the threshold voltage of the memory cells becomes higher than a reference cell of the reference current supply unit by comparing a reference current generated in the reference current supply unit with a drain current of the memory cells using the comparator (col. 13, line 33-45) (fig. 6, step s3, s7, s11).

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. Takeuchi (5684739), Hirakawa (5943260) and Hirano et al (6172912) disclose a memory device with multi-level memory.

7.   When responding to the office action, Applicants' are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

8.   A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see MPEP 710.02 (b)).

9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is (703) 306-5731. The

examiner can normally be reached on Mon. - Fri. from 8:00 A.M. to 5:30 PM. The

examiner's supervisor, David Nelms, can be reached on (703) 308-4910. The fax

phone number for this Group is (703) 308-7722. Any inquiry of a general nature or

relating to the status of this application or proceeding should be directed to the Group

receptionist whose telephone number is (703) 305-0956.

C. Yoha

March 2003

Connie C. Yoha

Patent Examiner

Art Unit 2818